

**CLAIMS:**

1. An electromechanical drive assembly, comprising  
a magnet structure which comprises at least one  
5 permanent magnet and is shaped to define an air gap; and  
a cylindrical coil which is received in the gap and  
movable axially therein relative to the magnet structure, the  
coil comprising at least one coil winding;  
wherein:  
10 the material and/or the shape of the magnet structure is  
such that the path of the magnetic flux of the permanent  
magnet is split.
2. An assembly according to claim 1, wherein the  
15 surfaces of the magnet structure defining the gap are shaped  
so that the path of the magnetic flux of the permanent magnet  
is split in the region of the gap.
3. An assembly according to claim 1, wherein the  
20 material of the magnet structure defining the gap is chosen  
so that the path of the magnetic flux of the permanent magnet  
is split in the region of the gap.
4. An assembly according to claim 2, wherein the  
25 magnet structure has in at least one of its surfaces defining  
the air gap at least one annular recess which extends to the  
gap.
5. An assembly according to claim 3, wherein at least

one of the surfaces of the magnet structure defining the air gap is formed from a material of reduced magnetic permeability relative to the remainder of the magnet structure.

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6. An assembly according to claim 1, wherein the magnet structure comprises at least one permanent magnet and at least one pole piece of ferromagnetic material..

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7. An assembly according to claim 6, wherein the gap is defined entirely by the pole piece(s).

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8. An assembly according to claim 6, wherein the gap is defined in part by the pole piece(s) and in part by the magnet(s).

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9. An assembly according to any of claims 6 to 8, wherein the magnet(s) and/or the pole piece(s) is/are shaped to define at least one annular recess in the magnet structure which extends to and merges with the air gap.

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10. An assembly according to claim 9, in which the pole piece(s) is/are shaped so that the or at least one recess extends from the air gap to the permanent magnet.

11. An assembly according to claims 6 to 8, wherein the magnet structure comprises at least one piece of material of reduced magnetic permeability relative to the pole piece(s), the or at least one piece of reduced permeability material

being annular in shape and extending from the air gap, where it defines a portion of the surface thereof, to the permanent magnet(s).

5           12. An assembly according to claim 1, wherein alternate annular portions of an inner surface of the air gap are formed from the magnet structure and from a material of reduced magnetic permeability relative to the remainder of the magnet structure.

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          13. An assembly according to claim 1, wherein alternate annular portions of an outer surface of the air gap are formed from the magnet structure and from a material of reduced magnetic permeability relative to the remainder of  
15 the magnet structure.

          14. An assembly according to claims 12 and 13, wherein the annular portions of the inner surface are aligned across the gap with the annular portions of the outer surface.

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          15. An assembly according to claim 1, wherein the surface of the magnet structure defining an inner surface of the air gap is shaped so that the inner surface of the air gap is interrupted by a plurality of annular recesses which  
25 extend to and merge with the gap.

          16. An assembly according to claim 1, wherein the surface of the magnet structure defining an outer surface of the air gap is shaped so that the outer surface of the air

gap is interrupted by a plurality of annular recesses which extend to and merge with the gap.

17. An assembly according to claims 15 and 16, wherein  
5 the inner annular recesses are aligned across the gap with the outer annular recesses.

18. An assembly according to claim 1, wherein alternate  
annular portions of one of the inner and the outer surfaces  
10 of the air gap are formed from the magnet structure and from a material of reduced magnetic permeability relative to the remainder of the magnet structure and the surface of the magnet structure defining the other of the inner and the  
outer surface of the air gap is shaped so that the said other  
15 surface of the air gap is interrupted by a plurality of annular recesses which extend to and merge with the gap, the annular portions of reduced magnetic permeability being aligned across the gap with the annular recesses..

20 19. An assembly according to any of claims 12 to 17, wherein there are at least two said annular portions of reduced permeability or at least two said annular recesses in each cylindrical wall of the air gap.

25 20. An assembly according to claims 12 to 17, wherein there are at least four said annular recesses extending to and merging with the air gap.

21. An assembly according to any preceding claim,

wherein the coil comprises a former on which are formed two or more axially-spaced coil windings.

22. An assembly according to claim 21, wherein the  
5 axial extent of the winding(s) is less than the axial extent of the air gap.

23. An assembly according to any of claims 1 to 6,  
comprising first and second permanent magnets which are  
10 spaced-apart in the axial direction of the air gap.

24. An assembly according to claims 1 to 6, comprising  
first, second and third permanent magnets which are spaced-  
apart in the axial direction of the air gap.  
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25. An assembly according to any preceding claim,  
wherein the magnet structure and the voice coil are  
substantially cylindrically symmetric.

20 26. An assembly according to claim 1, wherein the  
magnet structure comprises a plurality of generally-conical  
pole pieces which are arranged about a common axis and nested  
within one another with air spaces therebetween, the outer  
edges of the pole pieces defining the inner wall of the air  
25 gap.

27. An assembly according to any preceding claim,  
wherein the air gap and the coil are each cylindrical.

28. A magnet and coil assembly comprising at least one magnetic circuit which is split so as to mitigate a permeability thereof.

5        29. A magnet and coil assembly comprising:  
         at least one magnet;  
         at least one coil; and  
         at least one magnetic circuit between the magnet(s) and  
         the voice coil(s), at least one of the magnetic circuit(s)  
10       being split so as to mitigate a permeability thereof.

30. A loudspeaker comprising an assembly according to claim 29 and a cone which is attached to the coil.

15       31. A drive assembly substantially as hereinbefore described with reference to the drawings.